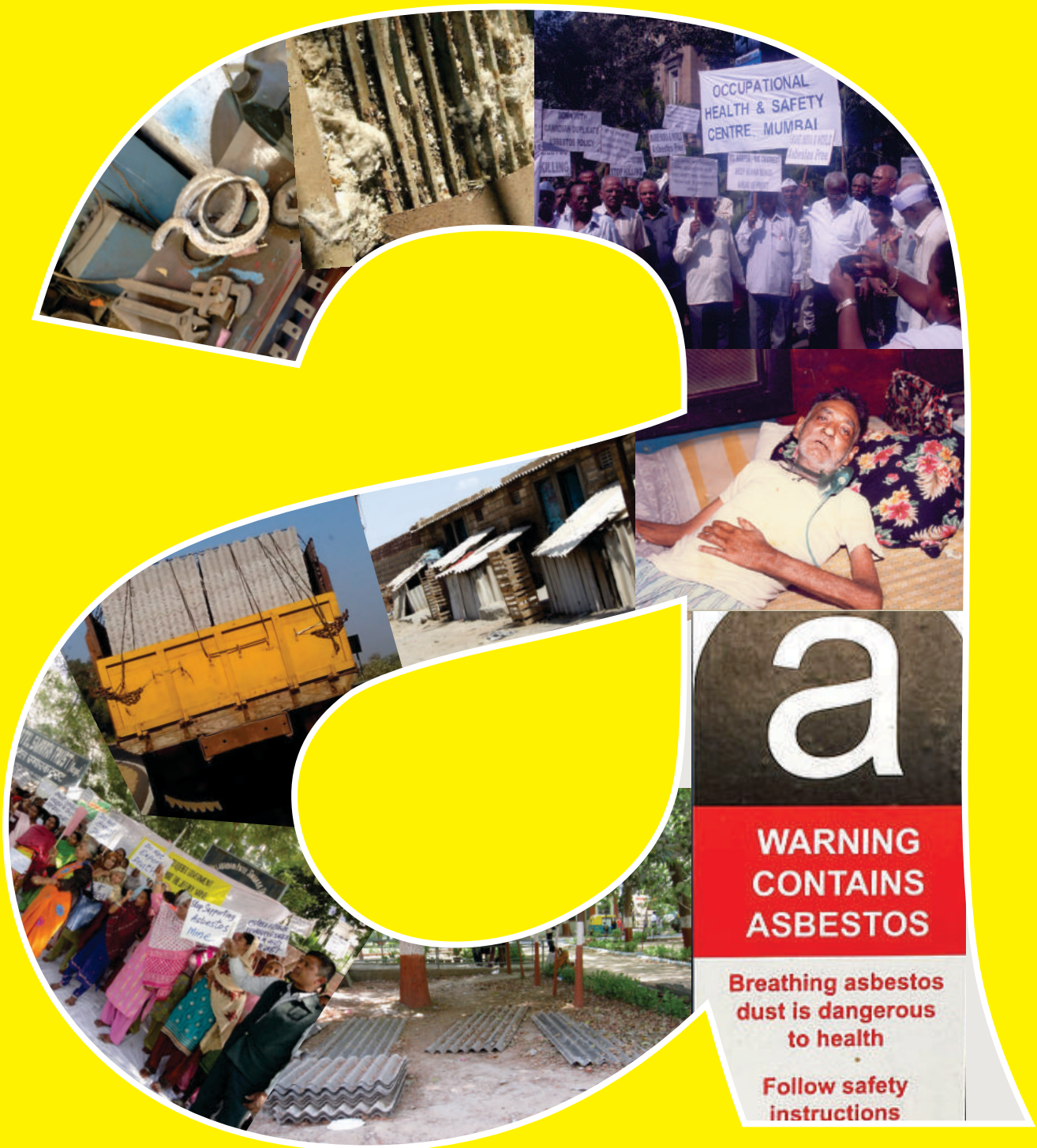
INDIA :
NATIONAL ASBESTOS PROFILE

(Based on the National Asbestos Profile by ILO and the WHO)



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19-04-2017

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List of Acronyms Used

Annual Survey of Industries	ASI
Asbestos Cement	AC
Asbestos Containing Materials	ACM
Asbestos Related Diseases	ARD
Bureau of Indian Standards	BIS
Central Pollution Control Board	CPCB
Disability adjusted life years	DALY
Employee's Compensation Act	EC Act
Employees State Insurance	ESI
Employees State Insurance Corporation	ESIC
Eurasian Economic Union	EAEU
Free Trade Agreement	FTA
Global Burden of Disease	GBD
Gujarat Pollution Control Board	GPCB
International Labour Organization	ILO
National Institute of Occupational Health	NIOH
Occupational Health and Safety Association	OHSA
Occupational Health and Safety Centre	OHSC
Right to Information	RTI
Threshold Limit Value	TLV
Time-weighted average	TWA
Turner & Newall	T&N
World Health Organization	WHO
Years lived with disability	YLD
Years of life lost	YLL

INDIA

JAMMU & KASHMIR
PAKISTAN
CHINA
HIMACHAL PRADESH
PUNJAB
CHANDIGARH
UTTARAKHAND
TIBET
ARUNACHAL PRADESH
HARYANA
DELHI
NEPAL
SIKKIM
UTTAR PRADESH
ASSAM
NAGALAND
RAJASTHAN
MEGHALAYA
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MANIPUR
JHARKHAND
TRIPURA
MIZORAM
MADHYA PRADESH
GUJARAT
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BENGAL
CHHATTISGARH
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DAMAN AND DIU
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Country Profile

Located in southern Asia, India is home to over 1.2 billion people, or nearly 18% of the world's population, making it the second most populous country in the world. India's population is growing at a rate of 1.2% per year. Nearly 69% of India's population lives in rural areas (833 million people), but this share is declining with large scale migration to cities and urban areas.

While the Indian economy is dominated by the service sector, the manufacturing sector grew at 9.3% in 2015.[1] The service sector nevertheless accounts for over 53% of the gross value added, while manufacturing accounts for a little over 17%.[2] Agriculture accounts for only 15% of the gross value added, but almost 50% of India's workers are dependent on the agricultural sector for livelihood.

India, like many other developing countries has a massive informal labor market, which is characterized by employment that falls outside of the ambit of formal regulations and legislative protections and social security for workers. Informal work accounts for more than 92% of the total employment in India. In the post-economic reform period (i.e. after 1991), the decline in public sector employment and growing demand for low-wage flexible labor has meant that nearly all of the growth in employment in the recent decades has come from the growth of informal work.

Many of India's most hazardous industries are primarily informal sector enterprises, which means that in addition to facing low wages and uncertain employment informal workers also face dangerous working conditions with recourse to only limited legislative protections in the case of work-related injuries or illnesses. Moreover, even in formal sector asbestos manufacturing units, a large section of the workforce is informal, i.e. comprised of contract or casual workers. Because informal workers are faced with little to no job security and negligible protections or benefits, workers often move from one work place to another. This mobility proves to be convenient for employers who are able to eschew their responsibility to maintain health records of workers for at least 40 years, as per the order of the Supreme Court.[3]

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[1] ILO, "India Labour Market Update."

[2] Ibid.

[3] D'Souza, "Is the Whole World Wrong?"

According to the World Health Organization (WHO), in 2014 non-communicable diseases in India accounted for 60% of total deaths. Within this 60%, cardiovascular diseases, cancers, and chronic respiratory diseases such as asbestosis and mesothelioma comprised 26%, 7% and 13% of the total deaths in India, respectively.[4]

Current Regulations

There are several pieces of legislation that regulate the use of asbestos in India. Yet, despite these multiple legal frameworks, they are inadequate as many of them do not stipulate exposure standards or where such standards are specified, they are often out of date or irrelevant to current working conditions.[5]

The Indian Factories Act (1948)

The Indian Factories Act (1948) stipulates protections for workers in the manufacturing sector employed in establishments that use power and employ at least 10 workers, or establishments that do not use power but employ at least 20 workers. There are three schedules within the Factories Act. Schedule I lists industries involving hazardous process. The asbestos industry—specifically activities involving the manufacturing, handling, and processing of asbestos—is listed as a hazardous industry under Schedule I of the Factory Act. Section 89 of the Act requires medical practitioners to report any occupational disease listed in Schedule III of the Act to the Chief Factories Inspector or other relevant factories. Schedule III of the Factories Act lists notifiable occupational diseases, including asbestosis. Schedule II lists the permissible level of chemical substances in the work environment, including asbestos (which is listed as a confirmed human carcinogen).

Section 85 empowers state governments to declare any industrial operation as hazardous. In Gujarat, for instance, Schedule XVII under Rule 102 of the state's Factories Rules, lists rules for the handling, processing, manufacturing of asbestos or any other process in which asbestos (in any form) is used (see A1. Gujarat Factory Rules (1963) in Annex for more details).

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[4]WHO, "India Country Report."

[5]Joshi, Bhuva, and Katoch, "Asbestos Ban in India: Challenges Ahead."

In some cases, companies that do not comply with factory regulations may be ordered to be closed down temporarily until the unit is able to meet the requirements set forth in the notice served under Sec.40 (1) of Factories Act.

While such provisions are an important step in protecting workers from the occupational risks associated with asbestos, they are also limited. In Gujarat, the first identified cases of asbestosis were found in thermal power plant, where asbestos is only handled, asbestos product is not manufactured. Sill the Labour Deptt. did not consider applying Schedule XVII (Rule 102 of the Gujarat Factories Rules) to the handling of asbestos in power plants. As a result, those who work in units that utilize asbestos products were deprived of the protection extended under Schedule XVII.

Voluntary organizations in Gujarat made several representations with the Labour Department to make the schedule applicable to power plants, but this was neglected by the government.

Indian Building and other Construction Workers Act (1996)

Schedule IX of the Indian Building and other Construction Workers (Regulation and the Employment and Conditions of Service) Act (1996) lists hazardous processes such as roof work and demolition but it does not include processes involving the handling or repairing of asbestos products such as asbestos cement pipes or sheets.[6] Schedule II of the Building and Construction Workers Act lists asbestosis as a notifiable occupational disease, but it does not include lung cancer or mesothelioma despite mounting scientific evidence of their connection to asbestos exposure in construction activities.

Regulations around Asbestos/Asbestos Containing Material (ACM) Imports

In 1986, the Ministry of Steel and Mines directed all state governments to cease the granting of new mining leases for asbestos because of the dangerous effects on the health of workers. Since then, there has been no further expansion of asbestos mining but a small number of mining operations still exist.[7] In 1993, crocidolite asbestos was banned in India.[8] Chrysotile asbestos, by far the most commonly used form of the mineral, is however still legal.

[6]Ibid.

[7]Indian Bureau of Mines, "Report on Study of Pollution Levels in Asbestos Mines and Processing Plants of Rajasthan for Lifting Ban on Expansion of Asbestos."

[8]Joshi, Bhuva, and Katoch, "Asbestos Ban in India: Challenges Ahead."

In 2015, in an order of the National Green Tribunal, the legal counsel representing the Indian Bureau of Mines stated "that there is no asbestos mining presently operational anywhere in the country and the operations of the mines of associated minerals with asbestos has also been halted." The statement ws supported by counsel representing respective states.[9] The order went on to direct that states in which asbestos mining occurs survey all the asbestos mines and associated minerals and report the impact of the mines and pits that are in existence as well as what steps the state government proposes to take to restore and restitute the affected area.[10]

The requirements for the closing down mines are included in the Indian Bureau of Mines Guidelines of Mine Closure Plan. Some of these requirements are listed below:[11]

- previously mined land is to be reclaimed and rehabilitated,
- surface and ground water bodies, including water that has been contaminated is to be protected
- corrective measures to prevent air pollution are to be taken; and
  protective measures for the prevention of siltation, erosion and dust generation from waste material are to be taken; where waste contains toxic elements,
- protective measures should be taken to prevent the dispersal in the air and leaching in the surface and ground water

However, even where mines have been abandoned or mining operations have otherwise ceased, mine owners or lessees have not followed all the necessary steps for mine closure.[12] In 2015, the National Green Tribunal ruled:

Final mining closure plans have also not been submitted by the concerned lessees. This can be a matter of concern. We therefore, direct the respective States to cause the survey of all the asbestos mines as well as of associated minerals with asbestos and state before us the the impact of overburden lying at the said mines and the pits existing there as of today, and if the overburden and such pits are noted then what the State proposes to do about restoration and restitution of the said area.[13]

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[9]Environics Trust V/s Union of India & Ors. And Amar Singh V/s Union of India & Ors.

[10]Ibid.

[11]Indian Bureau of Mines, "Guidelines for Preparation of Mine Closure Plan."

[12]Environics Trust V/s Union of India & Ors. And Amar Singh V/s Union of India & Ors.

[13]Ibid.

Under the 2009-2014 Foreign Trade Policy of India, asbestos (under heading 2524) can be freely imported. There are, however, controls on the import of certain asbestos minerals, such as amosite. In addition to amosite, crocidolite, actinolite, anthophyllite, and tremolite are restricted according to the Interim Prior Informed Consent (PIC) procedure of the Rotterdam Convention for Hazardous Chemicals and Pesticides.[14] In October 1998, the Ministry of Environment and Forest issued a notification that prohibits the imports of waste asbestos (dust and fibers) under the Environment Protection Act, 1986 and Environment Protection Rules, 1986 due to human and environmental health hazards.[15] While such prohibitions on the import of hazardous waste like asbestos do exist, numerous loopholes nevertheless allow companies to continue to exploit asbestos and expose workers to asbestos-related diseases. For instance, in 2007 Supreme Court ruled that hazardous waste, if contained in other waste items, such as end-of-life ships, could still be imported.[16]

Currently, India is in the midst of negotiating free trade agreement (FTA) with the Eurasian Economic Union (EAEU) in which asbestos is included as part of the tariff liberalization program. In a response to a Public Greivance petition filed with the Department of Commerce in February 2017, Under Secretary Vijay Shanker Pandey has stated that the "suggestion/concern […] has been noted and necessary action on that would be considered before signing the FTA."[17]

Thus while there legal provisions to protect workers from occupational hazards caused by asbestos exposure do exist in India, activists visted few asbestos plants in 2014 and observed that there is weak, and in many cases non-existent, enforcement of these rules. The asbestos industry is often found violating Supreme Court orders and face little to no consequences as a result.

Environmental Legislation

Any establishment for the manufacture of asbestos or asbestos related products requires prior environmental clearance regardless of the size of the investment and plant. An Environmental Impact Assessment Report must be provided by the company.

[14]Indian Bureau of Mines, "Asbestos."

[15]Ibid.

[16]Krishna, "Dumping Hazardous Waste in India: Toxic Ships."

[17] Parekh, "DOCOM/E/2017/00268 Public Greivance Filed with Department of Commerce."

Asbestos is listed as a hazardous waste in the Environment (Protection) Act (1986), under sections 6, 8 and 25. Under Waste Category 14, the regulatory quantities of asbestos that can be generated are 200 kilograms per year. If this amount is exceeded, "the occupier generating hazardous wastes…shall take all practical steps to ensure that such wastes are properly handled and disposed of without any adverse effects which may result from such wastes.The occupier shall also be responsible for proper collection, reception, treatment, storage and disposal of these wastes either himself or through the operator of a facility." [18]

Asbestos is also regulated by the Hazardous and Other Wastes (Management and Transboundary Movement) Rules (2015). The production of asbestos or asbestos-containing materials is listed as a hazardous waste generating process, and asbestos-containing residues, discarded asbestos and dust or particulates from exhaust gas treatment are included as hazardous wastes under Schedule I of the Rules.[19]

Legislative Framework for Compensation

Under the Employees State Insurance Act of 1948 (here in ESI Act), the Employee State Insurance (ESI) Corporation is responsible for paying compensation to insured workers for scheduled occupational diseases such as asbestosis and lung cancer, including mesothelioma. However, there is no provision to compensate environmental asbestos victims or those who have had secondary exposure.

The provisions for compensation are listed under Section 52 A of the ESI Act (SeeA3. Section 52A in the Employees State Insurance Act (1948) in Appendix for full text).Under Part B of Schedule III of the ESI Act[20] the provisions state that the qualifying period to claim compensation for the diseases listed in Part B of the Schedule is 6 months. Lung cancer and mesothelioma caused by asbestos are included as occupational diseases under Part B of Schedule III of both ESI and Employee's Compensation (EC) Act.

Asbestosis is included in Part C of Schedule III of the ESI Act (and EC Act). This means that workers must be employed for a minimum of three years before they can claim compensation under the ESI or EC Act. This is per notification number WCA 1162/91031 LAB III 9-12-1961 New Delhi of the Government of India.

[18]Ministry of Environment and Forests, Environment Protection Act (1986).

[19]Ministry of Environment and Forests, Hazardous Wastes (Management and Handling) Ammendment Rules.

[20] Schedule III is common to both ESI and Employee's Compensation (EC) Act

Workers who are not insured under the ESI Act can claim compensation under the Empoyees's Compensation Act of 1923. Legal battles for compensation are complicated and time consuming. Moreover, many workers—especially those employed by contractors— face difficulties establishing the employee-employer relationship required by law. In terms of medical diagnoses, workers run into problems because medical certificates are not available or doctors use different standards to evaluate disability due to occupational health hazards.[21] There is also a problem of misdiagnosis of dust-related lung diseases, including asbestos, as tuberculosis (TB). Another difficulty is, even when workers have won claims under the Employee's Compensation (EC) Act, the claimnant may not be paid the amount as ordered by Compensation Commissioner. The claimant has to take up another battle to get paid through district collectorate and if that does not work, one may have to file petition in High Court. Filing a petition in the High Court is not easy and requires financial resources. EC Act also provides for treatment cost but that too is difficult to get. As soon as worker raise the claim one is shown the door. Workers fear this and this fear pull them back from raising claim under EC Act.

Legal orders emerging from Public Interest Litigation

In response to a Consumer Education and Research Centre (CERC) petition with the Supreme Court, Chief Justice of India, A.M Ahmadi, passed an order on January 21, 1995 (nearly a decade after the courts accepted the petition) that contained the following salient points:[22]

- Companies should maintain the health records of employees for 40 years since the start of employment or 15 years after leaving employment
- National Institute of Occupational Health (NIOH) should decide when diagnoses of asbestos-related diseases (ARD) are disputed
- Indian Rupees 100,000 should be paid to victims of ARDs
- There should be special monitoring of small-scale units manufacturing asbestos products
- The permissible levels of asbestos exposure should be regularly reviewed
- Facilities for membrane filter test facilities for measuring dust levels should be set up

[21]Medhi and Gupta, "Country Report: India."

[22]Patel, "The Struggle Against Asbestos-Related Diseases in Gujarat."

Voluntary Standards

Units may comply with the Bureau of Indian Standards (BIS) on occupational health and safety standards for the use and handling of asbestos products (BIS:11451-1986 (reaffirmed 2010)). BIS standards include guidelines for the safe usage of asbestos cement products, asbestos friction products and asbestos sealing and insulation products. There is also a stipulation that products contaminated with asbestos contain a pictorial warning and that adequate exhaust ventilation systems be installed.[23] See Appendix section A2. Recommendations for Safety and Health Requirements Relating to Occupational Exposure to Asbestos for more details on BIS relating to asbestos use. In many cases, however imported asbestos used as raw materials come into India with no warning while when the finished products are ready for export, they leave the country with warnings affixed.

The Indian standards on asbestos mentioned above (BIS 11451-1986 (reaffirmed 2010)) also stipulate that workers who face the possibility of exposure to airborne asbestos should undergo a medical examination prior to commencing employment to determine existing medical conditions that may act as a contra-indication to exposure to asbestos dust, to establish medical baselines for future monitoring of workers' health conditions, and finally, to inform and advise workers about the risks associated with asbestos exposure and the measures taken in the workplace to prevent health hazards due to asbestos. In addition to pre-employment medical examination, BIS also stipulates that periodic medical examinations be conducted with regular frequency (at least every three years or more frequently if deemed necessary by occupational health professionals). Once employment has ceased, the employer is also responsible for conducting a full medical examination and follow up exams of retired workers who show symptoms of asbestos related diseases.[24]

Incipient Government Support towards a Ban on Asbestos

In 2009, the Kerala State Human Rights Commission issued an order against the use of asbestos. It recommended that the state government replace roofs of government school buildings; that the government ensure that private schools also replace their asbestos roofs; and that the government should ensure that no new school is allowed to use asbestos roofs.[25]

[23]Bureau of Indian Standards, Recommendations for Safety and Health Requirements Relating to Occupational Exposure to Asbestos.

[24]Ibid.

[25]Kerala Human Rights Commission Asbestos Order.

That same year, the Indian Railways announced that it planned to stop using asbestos on station roofs. Railway officials reported that the process of replacing asbestos with metal or aluminum sheets would be gradual as asbestos is used in nearly 7,000 stations across the country.[26] See Figure 12 for more details.

Before the Planning Commission was dismantled in 2014, a National Plan to Eliminate Asbestos was articulated by the Ministry of Employment and Labor and was to be carried out within the 12th Five Year Plan (2012-2017). The National Plan to Eliminate Asbestos aimed to protect workers and the general population from primary and secondary exposure to chrysotile asbestos, especially in the unorganized sector and in small and medium scale enterprises, where currently there is a dearth of information regarding the extent of asbestos related disease despite the significant use of and exposure to asbestos in these sectors.

In 2011 the Working Group of Occupational Safety stated that "it is high time that the government take initiative in formulating a national plan for prevention and control of silicosis and asbestosis in India so that the objective of the World Health Organization to eliminate [these diseases] by 2030 is achieved."[27]

Most recently, in August 2016, the Minister of Environment, Forest and Climate Change, Mr. Anil Madhav Dave stated that asbestos use should end given its adverse impact on human health.[28]

Import and Consumption of Asbestos (total and per major uses and forms)

While public concern and mobilization against the use of asbestos in developed countries has led to heavy regulations or complete bans of asbestos and its related materials, there has been significant growth in asbestos production and use in developing countries, including India.

As shown above in Figure 1 asbestos imports decreased between 2012 and 2013. According to Government of India projections however, an increase in demand from close to 400,000 to 600,000 is expected by 2017.[29]

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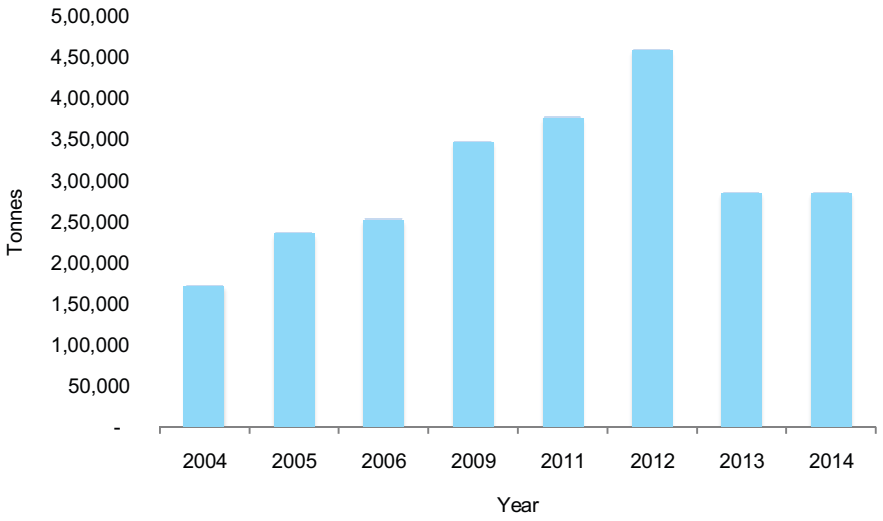
[26]Nair, "Railways Turns Over a New Roof."

[27]Ministry of Labour and Employment, "Report of the Working Group on Occupational Safety and Health for the Twelfth Five Year Plan."

[28]Mohan, "Will Look for Alternatives to Carcinogenic Asbestos: Mantri."

[29]Indian Bureau of Mines, "Asbestos."

Figure 1: Asbestos Imports (2004-2014)



Source: Indian Bureau of Mines and US Geological Survey Data

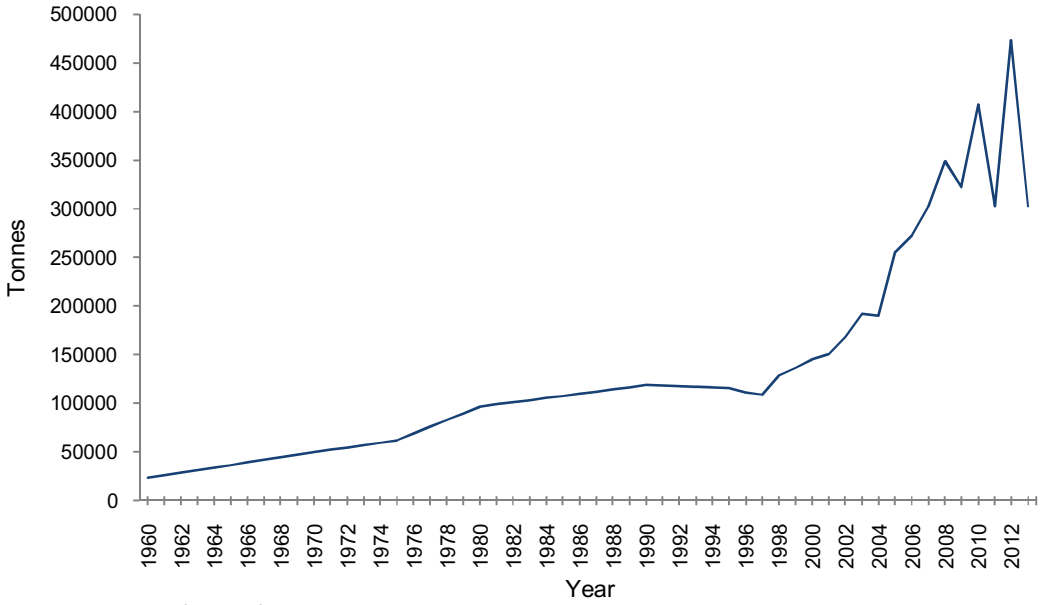
India is one of the world's largest importers of asbestos. In 2015, it imported over 370,000 tonnes of asbestos, with the trade value totaling over $239 million.[30] This represents over 57% of the share of total imports of asbestos worldwide. Chrysotile asbestos fibres make up a majority of imports. 60% of India's imports of asbestos come from Russia.

India's share of global consumption of asbestos has been steadily rising since 1960. While worldwide consumption peaked in 1980 and has been declining since, Indian consumption shows the opposite trend. As shown in Figure 2 below, from 1960 to 2003, India's consumption increased steadily from approximately 23,600 tonnes to 192,000 tonnes. In 1960, India accounted for a little over 1% of global consumption of asbestos, but by 2003 its share had risen to 9.11%. Since 2003, India's consumption has continued to grow. In 2013-2014, India consumed 286,001 tonnes of asbestos.[31] Today, it is Asia's second largest consumer of asbestos after China.

[30]"United Nations Trade Data."

[31]Indian Bureau of Mines, "Asbestos."

Figure 2: Indian Asbestos Consumption (tonnes)



Source: US Geological Survey Data

Import of Asbestos Containing Materials (ACMs)

Other than chrysotile asbestos fibres, India imports asbestos cement products, asbestos rock and other products.Asbestos cement products comprise around 2% of total imports. Asbestos rock and other asbestos imports together comprise the remaining 1%.[32]

Domestic Production of Asbestos

In 2013-14, India produced 227 tonnes of asbestos, which represents a decrease of 42% from the previous year.[33] All of the government-reported production in 2013-14 came from three private sector mines in Andhra Pradesh's Cuddappah (Kadapa) district. Illegal mining also exists, however. Its contribution is estimated at 18 to 20,000 tonnes per year.[34]

While the economic impact of asbestos mining in India is minimal, mining operations nevertheless pose significant adverse consequences for human and environmental

[32]Ibid.

[33]Ibid.

[34]Rahman, "Health Hazards due to Asbestos Exposure in India."

health.[35]In the Roro Hills of Jharkhand for instance, even where mines have been abandoned, a massive pile of asbestos waste mixed with chromite remains on the hilltops. During the monsoon season, this waste seeps into the land, water, and bodies of the tribal communities that reside at the foothills. In the summer, asbestos waste is made airborne by warm winds, which poses a particularly large threat of exposure to children and the elderly.[36]

Domestic Production of Asbestos Containing Materials (ACMs)

The fabrication of ACMs—specifically asbestos cement sheets—began in India in 1934. Throughout the 20th century, asbestos and ACM industries saw substantial expansion, despite the widely known occupational and environmental health hazards due to asbestos exposure.

Today the ACM is a multi-billion dollar industry that has seen double-digit growth in recent years.[37] India's chrysotile asbestos cement industry dominates the national asbestos market. In the ten-year period between 1993 and 2003, asbestos-cement production grew from 0.68 million tonnes to 1.38 million tonnes, an increase of 100%.[38] According to the Asbestos Cement Product Manufacturer's Association (ACPMA), from 2000 to 2015, there has been a four fold increase in the production of asbestos cement roofing sheets.[39]

Asbestos products, such as jointings sheets, are also used in the ceramics and allied products industry. For 2016-2017, ceramics firms in India adopted a target of 7.28 million USD for the export of asbestos jointings and 8.55 million USD for the export of other asbestos products.[40]

According to the table below asbestos and asbestos containing products are produced in over 150 different factories in India. As shown Table 1 below, approximately two-thirds of the units are located in the western industrialized states of Gujarat and Maharashtra

[35]Dutta, Sreedhar, and Basu, "The Blighted Hills of Roro, Jharkhand, India: A Tale of Corporate Greed and Abandonment."

[36]Ibid.; Subramanian and Madhavan, "Asbestos Problem in India."

[37]Daigle, "How the Asbestos Industry Is Pushing Its Lies in India."

[38]Joshi and Gupta, "Asbestos in Developing Countries: Magnitude of Risk and Its Practical Implications."

[39]D'Souza, "Is the Whole World Wrong?"

[40]No.CAPEXIL/ER/UG/CERAMICS/16-17/135, "Minutes of Meetings of Ceramics and Allied Products, Including Refractories Panel of CAPEXIL."

alone. Please note that Table 1 does not reflect a comprehensive account of the asbestos industries in India. For more details on the companies please seeA4. Asbestos Companies and Traders in Indiain the Appendix.

Table 1: Asbestos Industries in select Indian States

State	Number of Asbestos Companies/Traders	% of Total
Gujarat	98	49
Maharashtra	36	18
Tamil Nadu	10	5
Uttar Pradesh	9	4
West Bengal	8	4
Andhra Pradesh	7	3
Delhi	6	3
Orissa	4	2
Rajasthan	4	2
Assam	3	1
Haryana	3	1
Telangana	3	1
Bihar	2	1
Madhya Pradesh	2	1
Himachal Pradesh*	1	0
Jharkhand*	1	0
Karnataka*	1	0
Kerala*	1	0
Punjab*	1	0
Tamil Nadu*	1	0
Grand Total	201	95

* These states account for 0.5% of the total

States like Bihar, have in recent years attempted to woo investments from asbestos companies despite the known dangers to human and natural environments as part of the relentless pursuit of economic growth. In 2009, the Bihar State Investment Promotion Board (SIPB) approved the establishment of a 1.5 lakh metric ton capacity asbestos fiber cement sheet factory in the state's Muzaffarpur district. The proposed plant in Muzaffarpur, owned by West-Bengal based Balmukund Cement and Roofing Limited, was an estimated 31 crore Indian rupee project (or 4,984,067 US dollars). The company claimed that it would generate employment for 500 villagers. Furthermore, Balmukund claimed incorrectly that the land for the plant was barren and sufficiently removed from inhabited areas of the district. Instead, the proposed site, near Bhisnupur-Chainpur village, is surrounded by farmland and human habitation.[41]

[41]Banerjee, "'Killer Dust' Threat Looms over Marwan despite Protests."

Other proposed asbestos factories in Bihar include three asbestos cement sheet plants and a grinding plant in Bhojpur district, owned by Ramco industries. Ramco set up their asbestos grinding plant in the Bihiya block of Bhojpur. Although they only had clearance for one factory with a capacity of 120,000 metric tons per annum, they set up a larger plant (of 200,000 metric tons per annum). After the death of a worker, the family of the deceased filed a case with the Bihar Human Rights Commission. Ramco gave the deceased worker's family a meager 5,000 Indian rupees of compensation and claimed that the worker was not on the shop floor but actually a cook to avoid any allegations of unsafe work conditions.

In West Champaran, Hyderabad Industries Limited had a proposal to set up a two-phase cement sheet production site. There was a proposal to establish another two-phase project to build asbestos cement and corrugated sheet factories in Vaishali, and an asbestos cement and pressure pipe production facility at Madhubani district. In other districts too, the company disclosed the dangerous nature of asbestos production from villagers.[42]

After struggles by villagers eventually, the District Magistrate of Muzaffarpur imposed prohibitory orders in the area around the plant in 2011.[43]In addition to Muzaffarpur, the Vaishali asbestos plant project was also stopped. However, despite cancelling the "No Objection Certificate" given to Nibhi and Ramco industries in Bhojpur, the units are still running. The group Toxics Watch Alliance has filed a complaint with the Bihar State Pollution Control Board.[44]

Estimated total number of workers exposed to asbestos in the country

According to the Report of the Working Group on Environmental and Occupational Health in India, there are two to three million active workerssuffering from exposure to asbestos and other dangerous fibers.[45]

However, because the industry employs a largely unorganized workforce, exact estimates of the size of the workforce in asbestos-related manufacturing are difficult to come by.

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[42]Thacker, "Bihar Revokes Clearance for Asbestos Factories."

[43] "Asbestos Factory Muzaffarpur, BH, India"; Chaudhary, "Bihar, India: Pe ople's Movement Stalls the Construction of an Asbestos Factory."

[44]Krishna, "Bihar Pollution Control Board Should Act against Asbestos Factories Violating Environmental Laws."

[45] Ansari et al., "Environmental Health Survey in Asbestos Cement Sheets Manufacturing."

Figure 3: Worker in an Asbestos Textile Factory

Photo Credit: Hein du Plessis

Full list of industries where exposure to asbestos is present in the country and list of industries with the largest numbers of workers potentially exposed to asbestos

The figures below only include establishments covered by the Annual Survey of Industries (ASI) and thus should be taken as a minimal approximation of the total number of workers potentially facing direct or indirect asbestos exposure. In addition to the industries listed in Table 1 below, in the food-processing sector, there are reports that finely ground asbestos powder is mixed with talc to polish rice.[46] Municipal demolition workers and disaster rescue workers are also at risk of asbestos exposure.

[46] Roy, Khanra, and Bhattacharya, "Asbestos: A Potential Food Contaminant and Associated Safety Risks to Consumers."

Table 2: Asbestos-Related Industries

3 digit NIC code	5 digit NIC code	Name	Number of Workers
089	08995	Mining of asbestos	8,072
201	20100	Chemicals	198,967
239	23953	Manufacture of asbestos sheets	738,169
	23959	Manufacture of other cement and asbestos cement products	
	23999	Manufacture of other non-metallic mineral products (includes asbestos yarn and fabric, and articles of asbestos yarn and fabric such as clothing, headgear, footwear, cord, string, paper or felt; friction material with a basis of asbestos	
	23943	Manufacture of asbestos cement	
	23956	Manufacture of insulation boards of vegetable fiber, straw or wood waste, agglomerated with cement and other mineral binders	
329	32902	Manufacture of safety equipment	50,858
351	35100	Power generation	-
383	38300	Ship-breaking	4,446
410	41000	Construction of buildings	-
431	43110	Demolition and site preparation	-
433	43300	Building completion and finishing	-
439	43900	Specialized construction activities	-
Grand Total			1,000,512

Source: Annual Survey of Industries

Asbestos products are also used in thermal power plants. Thermal power plants comprise approximately 70% of the all-India installed capacity for electricity generation. [47] There are about 132 plants and 430 units throughout the country.[48]Asbestos is used in several areas in thermal power plants, including steel pipe insulation, in gasket joints in hot water drain pipes, in the ropes that are used for gland packing, duct insulation, as well as in safety equipment such as fire retardant gloves and curtains. Asbestos ropes and clothes are used in many of these applications.

Power plants are classified as an industry "involving hazardous processes" under the Factories Act (1948) of India (Section 87, 63 of 1948). Power plant workers tasked with the maintenance of boilers are exposed to pollutants such as coal, coal dust, ash and oil

[47]Central Electricity Authority, "Executive Summary Power Sector."

[48]ENVIS Centre on Flyash, "Thermal Power."

residues. Workers who clean boilers and furnaces are exposed to toxic fumes and gases from the chemicals used for cleaning as well as to hazardous dust particles that may be inhaled when brushing or sweeping.

Outside of the large-scale manufacturing sector, asbestos products are used in a variety small-scale operations in India. Below, in Figure 4 the owner of a small clothing press uses a heat-resistance asbestos padas a rest for her iron (Figure 5 shows a close-up of the asbestos pad).

Figure 4: Asbestos used for its heat resistant properties in small scale press shops in India

Photo Credit: Jagdish Patel

Figure 5: Close up of asbestos pad

Photo Credit: Jagdish Patel

Below, an automobile mechanic repairs a two-wheeler. Pictured are asbestos brake linings that he is handling without any safety measures. Such repair shops can be found on nearly every street corner in India.

Figure 6: Asbestos brake shoe being replaced in a road side automobile repairshop

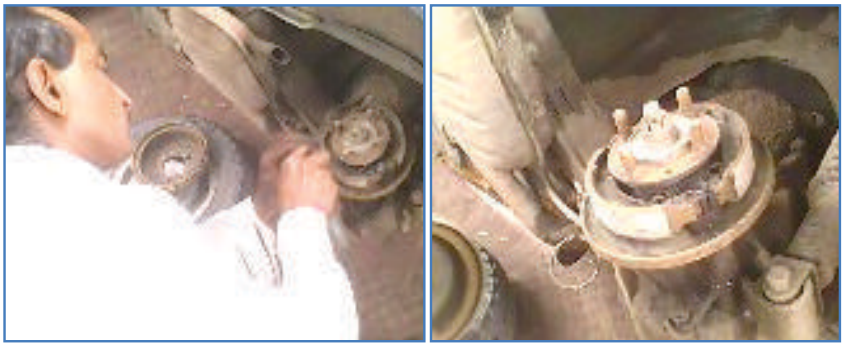

Photo Credit: Jagdish Patel

Industries with high risk of exposure (where overexposure is documented as exceeding occupational exposure limits) and estimated total number of workers at high risk

According to the National Institute of Occupational Health (NIOH), asbestos cement, asbestos textile, and asbestos mining and milling are the main sites of significant occupational exposure to asbestos. NIOH studies[49] in these sectors have found the following:

- In the asbestos cement industry, the NIOH reports that the levels of asbestos fibres were 2 fibres per mL, which is double the permissible level of asbestos 1 fibre per mL. The epidemiological study carried out in four asbestos cement factories revealed that the prevalence of asbestosis varied from 3 to 5% of workers.
- In the asbestos textile industry, the levels of airborne fibres far exceeded the limit. In the factories studied by the NIOH, asbestos fibres were found to be at 216 to 418 fibres per mL. Asbestosis was present among 9% of workers. While this figure is may seem low compared to the high levels of airborne asbestos, asbestosis was nevertheless identified in workers having less than 10 years of exposure (whereas the average duration of exposure is 20 years)
- In asbestos mining and milling, asbestosis was found to be prevalent among 3% of mining and 21% of milling workers. Asbestos fibres in the air were under the limit in mining sites studied by NIOH, but in milling units, the airborne levels were between 45fibres per mL to 244 fibres per mL of air.

[49]NIOH, "About Asbestosis."

Figure 7: Loose asbestos fibers in asbestos textile factory

Photo Credit: Hein du Plessis

Estimate of the burden of diseases related to asbestos: disability adjusted life years (DALYs) and deaths attributable to asbestos exposure

Based on the Global Burden of Disease (GBD) database, an estimate of disability adjusted life year (or DALY) was produced by combining years lived with disability (YLD) and years of life loss due to mortality (YLL). One DALY is one lost year of healthy life and the sum of DALYs in a population can be understood as the gap between the population's present health status and an ideal situation where entire population lives to an advanced age free of disease.[50] Globally, All-age DALYs for asbestosis increased from 76 to 92 from 2005 to 2015.[51] Unfortunately, while country-level data for India is included in the GBD data, information on the prevalence and impact of asbestosis in terms of YLDs and DALYs is not available for specific countries.

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[50]GBD 2015 Mortality and Causes of Death Collaborators, "Global, Regional, and National Life Expectancy, All-Cause Mortality, and Cause-Specific Mortality for 249 Causes of Death, 1980–2015: A Systematic Analysis for the Global Burden of Disease Study 2015."

[51]GBD 2015 DALYs and HALE Collaborators, "Global, Regional, and National Disability-Adjusted Life-Years (DALYs) for 315 Diseases and Injuries and Healthy Life Expectancy (HALE), 1990–2015: A Systematic Analysis for the Global Burden of Disease Study 2015."

Prevalence of asbestosis (total number of workers with diagnosed asbestosis, asbestos-related lung cancer and mesothelioma to-date) – national data, a breakdown by industries if available

Asbestosis refers to the hardening of lung scar tissue that arises from the inhalation of asbestos fibers over an extended period of time. Asbestosis patients suffer from breathlessness, which can progress to respiratory and cardiac insufficiency. Typically, asbestosis has a latency period of ten to twenty years, although it could also be longer.[52] The latency period depends on the level of exposure: the higher the exposure, the shorter the latency period.[53] Asbestosis is an irreversible condition and can progress even once exposure to asbestos has stopped.

Unfortunately, there is a severe lack of government data on the prevalence of asbestosis in India and the data that is available is often unreliable. Nevertheless, over the decades, different groups have made efforts to gather data on asbestosis. The following is the picture that emerges from these efforts.

In the late 1970s, a study conducted by Dr. James Allardice saw 10 cases of asbestosis in Kolkata (Calcultta), West Bengal and one case in Keymore, Madhya Pradesh.[54]

A study conducted in 1980 in the Shree Digvijay Cement factory in Ahmedabad, Gujarat by the Central Labour Institute (CLI) confirmed that 6.5% of examined workers had asbestosis, while 32% of workers were "suspected" to have asbestosis.[55]

In the 1980s, a study at King Edward Memorial Hospital in Mumbai, Maharashtra, of more than 800 workers from the asbestos-cement industry revealed that 28% of workers had asbestosis. Similar results were found in an asbestos brake-lining factory.[56]

Dr. Sudhakar Kamat later examined chest radiographs taken from workers of different asbestos-cement plants and asbestos mines and found that across three Indian states the prevalence of asbestosis ranged from 22% to 77% of workers examined. The results from this study are presented in Table 3 below:

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[52]Central Pollution Control Board, "Human Health Risk Assessment Studies in Asbestos Based Industries in India"; Munich Re, "Asbestos: Anatomy of a Mass Tort."

[53]Munich Re, "Asbestos: Anatomy of a Mass Tort."

[54]Allardice, "Letter Regarding Visit to India"; Tweedale, "Asbestos Multinationals in India."

[55]Patel, "The Struggle Against Asbestos-Related Diseases in Gujarat."

[56]Kamat, "Asbestos-Related Disease in India."

Table 3: Asbestosis Incidence across different Indian States, 2002-2003

State	Total Number Examined	Number of Asbestosis Patients	% with Asbestosis
Tamil Nadu	140	31	22
Rajasthan (1)	49	24	49
Rajasthan (2)	111	86	77
Gujarat	108	48	44
Total	408	189	46.32

Source: Kamat, "Asbestos-Related Disease in India"

In 2003, a joint effort by two voluntary organizations, Kalyaneshwari and the Occupational Health and Safety Association (OHSA), studied asbestos cement and power plant workers. The findings revealed that 15 workers from the asbestos-cement factory and 6 power plant workers had asbestosis. Moreover, three spouses of these workers were also diagnosed with asbestosis.[57]

Respiratory diseases due to the inhalation of toxic dust containing asbestos, silica, arsenic and vanadium particles have been identified in power plant workers throughout India. Across three thermal power plant stations in Gujarat, 17 out of 19 workers diagnosed with asbestosis worked in the cleaning cell. The remaining two worked in the coal plant and fly-ash sections. As shown in the table below, on average workers with asbestos suffered from between 41 to 50% disability. Out of the 19 asbestosis patients identified, 7 were women (from the Gandhinagar Gujarat Electricity Board power station).

Table 4: Thermal Power Plant workers diagnosed with Asbestosis in Gujarat

Thermal Power Plant Station	Total Number of Workers Diagnosed	Workers with Asbestosis	Average Disability (%)	Average Age
Sikka	13	2	50	47
Wanakbori	15	9	45	50
Gandhinagar	25	8	41	45
Total	53	19	46	47

Source: Response from RTI filed by Ragunath Manwar

[57]Patel, "The Struggle Against Asbestos-Related Diseases in Gujarat."

A 2014 study of the morbidity of thermal power plant workers at Parali in Maharashtra, India, researchers found that many workers suffered from asbestos-related disease due to exposure to asbestos at the workplace in addition to other respiratory and pulmonary dysfunctions.[58]

In 2004, of the approximately 182 workers tested from the Hindustan Composites plant in Ghatkopar, Mumbai, 41 cases of asbestosis (22%) were confirmed.[59]83% of those diagnosed with asbestos had parenchymal asbestosis, 7% had pleural asbestosis (i.e. pleural thickening), and a further 10% of workers had both forms of asbestosis. All of the workers diagnosed with asbestosis had at least 20 years of exposure.[60]

In 2008, the results of a study by Dr. Qamar Rahman examining the occupational exposure and health impacts of asbestos exposure on workers in small and large-scale units in Maharashtra and Rajasthan were published. Dr. Rahman's team found the incidence of asbestosis in the unorganized sector units included in the study to be 21%. 59% of the workers diagnosed with asbestosis had less than 5 years of exposure.[61]

In the organized sector units, the incidence of asbestosis among the workers included in the study was 26%. Compared to their counterparts in the unorganized sector, workers in the organized sector units were mostly exposed to asbestos for 25 to 40 years.[62]

In the ship-breaking yards of Alang, in the western Indian state of Gujarat, a study by the National Institute of Occupational Health (NIOH) found in a sample of 98 workers, 16% were diagnosed with asbestosis.[63]Activists sought more details on the study but NIOH refused to reveal details.

A recent study published in 2016 revealed that in small-scale clutch manufacturing, over 70% of workers examined had asbestos-induced lung disease.[64] One of the fourteen workers examined passed away due to asbestosis. None of the workers were informed about the health hazards of asbestos.

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[58]Kawalkar et al., "Morbidity Profile of Employees Working in a Thermal Power Station Parali."

[59]Muralidhar and Kanhere, "Asbestosis in an Asbestos Composite Mill at Mumbai: A Prevalence Study"; Gaitonde and Dutta, "The Struggle by Mumbai Asbestos Workers for Compensation."

[60]Gaitonde and Dutta, "The Struggle by Mumbai Asbestos Workers for Compensation."

[61]Rahman, "Health Hazards due to Asbestos Exposure in India."

[62]Ibid.

[63]Krishna, "Dumping Hazardous Waste in India: Toxic Ships."

[64]Gothi et al., "Asbestos-Induced Lung Disease in Small-Scale Clutch Manufacturing Workers."

As mentioned above, it is a well-recognized fact that there is a paucity of reliable data on occupational health in India.[65] According to the Central Labor Institute, there is a 7.25% prevalence rate of asbestosis among workers.[66] It is important to note that this figure is significantly lower than the figures that emerge from the smaller scale studies discussed above.

The estimated number of observed deaths due to asbestosis in India increased over three-fold from 193 in 1990 to 584 in 2016.[67] See Figure 9 for more details.

Incidence of lung cancer among workers exposed to asbestos

Asbestosis patients are at a higher risk than others of developing lung cancer, which is further exacerbated among smokers.[68] In other words, asbestos exacerbates the carcinogenic properties of tobacco in addition to independently damaging lung tissue and triggering asbestosis. According to GBD data, in India the incidence of lung cancer due to occupational asbestos has been decreasing since 1990 (see Figure 9 for more details).[69] Globally, however, the opposite is true.

A study by the Cancer Research Institute, in Chennai, Tamil Nadu, reported that between 3 to 4% of all lung cancer in India is asbestos related.[70]Doctors in India have found that lung cancer can develop within a short time frame (i.e. less than one year) in workers who were formerly exposed to asbestos. Moreover, the available medical evidence suggests that there should be a greater frequency of check ups than the current recommendation of every 3 to 5 years, which is insufficient to detect asbestos-related lung cancer at a curable stage.[71]

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[65]Government of India Planning Commission, "Report of the Working Group on Occupational Safety and Health for the Tenth Five Year Plan."

[66]Ibid.

[67] GBD 2016 Observed ARD Deaths

[68]Kishimoto et al., "Clinical Study of Asbestos-Related Lung Cancer in Japan with Special Reference to Occupational History."

[69] GBD 2016 Observed ARD Deaths

[70]Clarke, "Potential Health Hazards of Asbestos Cement Roofing for India's Poor"; see also Rai, "Zee News Online."

[71]Muralidhar, "Parenchymal Asbestosis Can Lead to Lung Cancer within a Short Time Frame."

Incidence of mesothelioma

Mesothelioma is a cancer of the protective tissue lining the lungs and abdominal cavity, known as the mesothelium. Mesothelioma is considered to be a "signal tumor" for asbestos exposure. While the tumor is considered to be rare, today mesothelioma is reported in nearly all major studies of asbestos exposure.

Between 1993-1997, only 56 mesothelioma cases were reported based on the following regional cancer registries in India.[72]

Table 5: Regional Mesothelioma Incidence between 1993-1997

Region	Number of Mesotheliomas
Delhi*	7
Bangalore	7
Madras	7
Karunagappally	0
Mumbai	33
Nagpur	0
Poona	2
Trivandrum	0
Total	56

Source: Kamat, "Asbestos-Related Disease in India"

**Data for Delhi is until 1996*

In response to an RTI petition dated June 2008, Tata Memorial Hospital reported that 107 cases of mesothelioma were diagnosed at the hospital over a twenty year period from 1985 to 2005. As shown in Figure 8 below, the highest incidence among male patients was found in the 50 to 59 year age group and for female patients in the 60 to 69 year age group.[73]

During 2009-2012, 21 Cases of mesothelioma were reported at Guj. Cancer Res. Inst. while in 2013, 23 Cases were diagnosed.

In 2011, doctors from Sparsh Chest Disease Centre in Ahmedabad in a paper presented at a conference in US, reported 30% prevalence rate of mesothelioma in northern Gujarat and a 32.75% prevalence in southern Rajasthan. In other parts of Gujarat, the prevalence rate was much lower, at around 9%.[74]

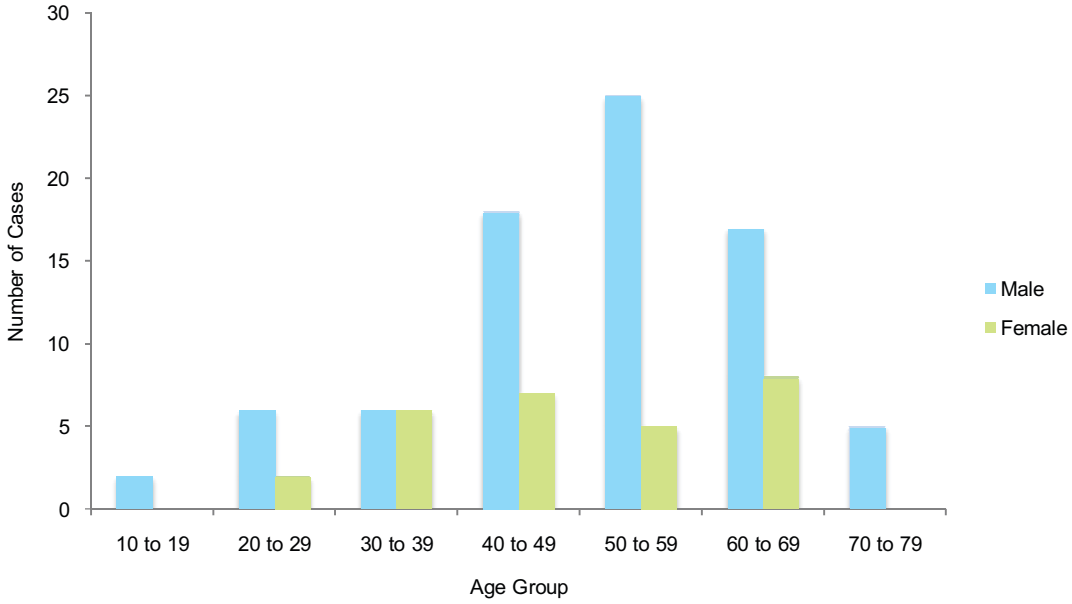
[72]Kamat, "Asbestos-Related Disease in India."

[73]Dutta, "The Indian Government's Complicity in the Asbestos Scandal."

[74]Desai, "Prevalence of Mesothelioma in Northern Gujarat Is Very High."

Based on the GBD data set, over the global prevalence of mesothelioma was estimated at 60,000. This represents an increase of 41.3 between 2005 and 2015. Years lived with disability (YLD) due to mesothelioma rangedfrom 8.7 to 15.8, an increase of almost 40% between 2005 and 2015.[75] All-age deaths due to mesothelioma also increased almost 40% between 2005 and 2015, from 23,000 to 32,000. DALYs due to mesothelioma jumped almost 29% from 544.9 to 701.9 in the ten year period between 2005 and 2015. Globally, 43,000 people worldwide die from mesothelioma annually.[76] Of these deaths, over 70% are from occupational exposure to asbestos (GBD 2016).

Figure 8: Mesothelioma Cases identified at Tata Memorial Hospital (1985-2005)



Source: Dutta, "The Indian Government's Complicity in the Asbestos Scandal."

In India, these figures are much lower. In 2015, almost 17% of reported mesothelioma cases in the GBD data set were due to occupational exposure from asbestos.[77]Since1990, this represents a decrease in the incidence of mesothelioma of approximately twenty-six percentage points (from 43% in 1990 to 17% in 2015).

[75]GBD 2015 Disease and Injury Incidence and Prevalence Collaborators, "Global, Regional, and National Incidence, Prevalence, and Years Lived with Disability for 310 Diseases and Injuries, 1990–2015: A Systematic Analysis for the Global Burden of Disease Study 2015."

[76]Stayner, Welch, and Lemen, "The Worldwide Pandemic of Asbestos-Related Diseases."

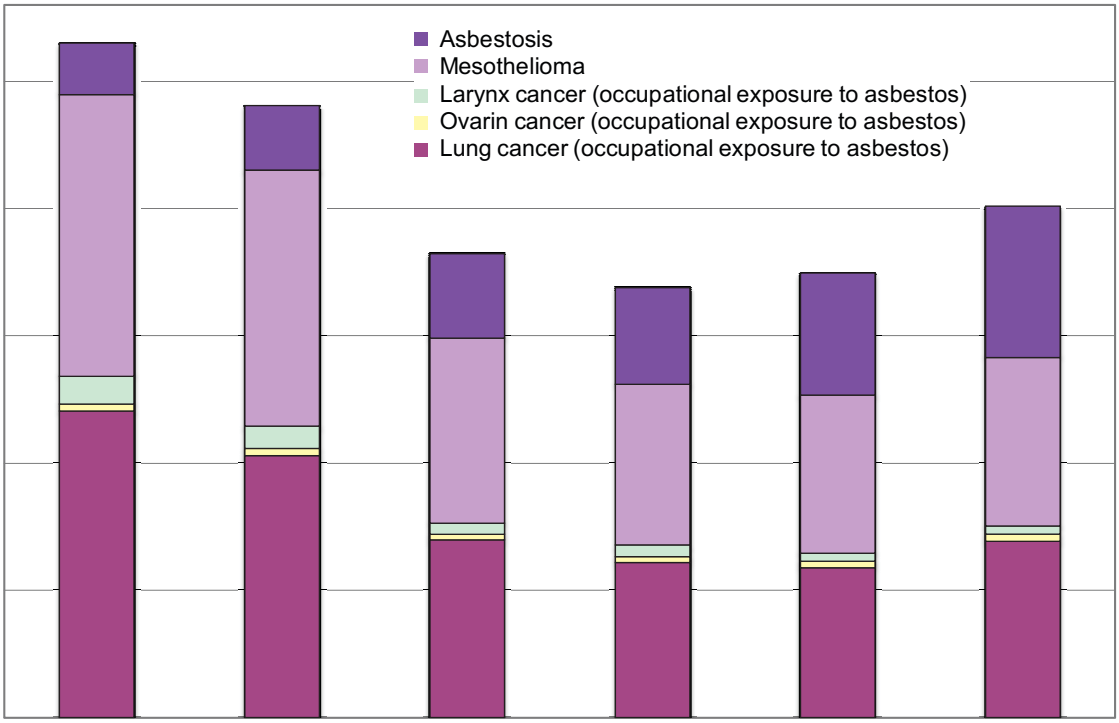
[77] GBD 2016 Observed ARD Deaths

In April 2016, the first victim of mesothelioma from the Mumbai plant of Hindustan Ferodo Limited was identified. While there have been many other reports of mesothelioma cases, the names of the victims have not been revealed by the hospital.

This is a significant finding because there is little expertise in diagnosing mesothelioma in India. Unfortunately, most workers die before they are diagnosed.[78]

In March 2017, three mesothelioma victims have been diagnosed by ESI Hospital in Ahmedabad. One of the victims, late Mr. Rajesh Vyas had secondary exposure. He happened to be son of a civil engineer at Gujarat Composite. Mr. Munnalal Ramgopal Sharma was employed by a foundry and Sanmugam, employee of Gujarat Composite Cement Company are suffering from mesothelioma. While Sarvan Singh Mobsingh and Bhavani Singh, both employees of Gujarat Composite suffer from tongue and larynx cancer. Currently victims are being helped to file claims for compensation under the ESI Act and other relevant laws.

Figure 9: Observed deaths in India due Asbestos Related Diseases, 1990 to 2015



Source: GBD database

[78]email communication from Mukherjee, "First Case of Mesothelioma of a Former T&N Worker."

Estimates on the percentage of house stock and vehicle fleet containing asbestos

Over 90% of asbestos products in India are used for manufacturing asbestos (AC) cement roof sheets for low-cost housing in rural and urban areas, schools, and industrial structures.

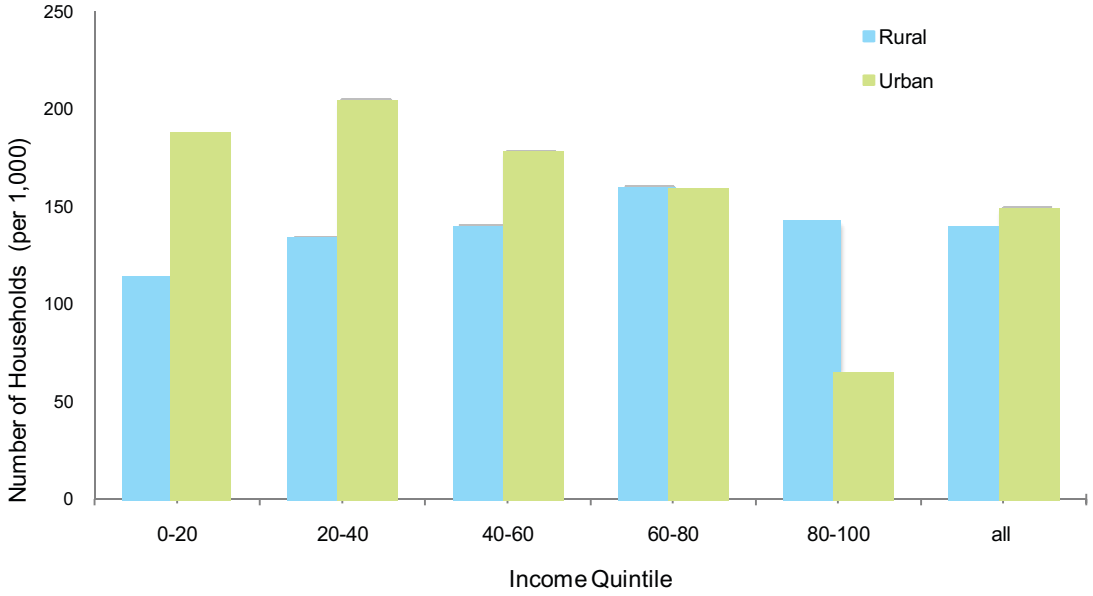
Figure 10: Asbestos Cement Sheets in low-cost housing

Source: Jagdish Patel

While data on roofs constructed exclusively with asbestos sheets is not available, the use of asbestos or iron, zinc, or other metal roof sheets is nearly at par in rural and urban households, without taking monthly consumption levels into account. Within the rural housing stock, wealthier households are more likely to have asbestos or iron, zinc or other metal roof sheets than poorer households. In urban areas, the opposite is true. While nearly 19% of urban households (187 out of 1,000 households) in the lowest income quintile used roof sheets containing asbestos or related materials, around 6% of households in the highest income used the same material (64 out of 1,000 households).

See Figure 11 below. on page 33

Figure 11: Roofs made with Asbestos, Iron, Zinc, or Other Metal Sheets by Income



Source: NSSO

The Government of India is also a consumer of AC products. Historically, AC sheets have been used by the Indian Railways in the roofing of railway platforms and by the Food Corporation of India as roofing for godowns storing grain and other food items.

It is estimated that in India, one-fifth of buildings (both public and privately-owned) are constructed with asbestos containing materials (ACM).[79]

In Figure 12 we see asbestos cement sheets removal is taking place on a railway station platformas per the Indian Railways decision to move away from the toxic material. While the removal of asbestos is a positive development, the asbestos sheets have been left on the platform for a long time without any safety precautions.

[79]Gaitonde and Dutta, "The Struggle by Mumbai Asbestos Workers for Compensation."

Figure 12: Asbestos removal on an Indian Railway Station Platform

Source: Jagdish Patel

Total number of workers eligible for compensation for asbestos-related diseases, such as asbestosis, lung cancer and mesothelioma(per year) and the numbers of individuals compensated yearly

Information obtained under the Right to Information Act (2005), indicates that compensation for asbestos related diseases (ARD) has been highly inadequate. As of 2008, only 30 cases of asbestosis had been compensated under Employee's Compensation and ESI Acts.[80]

At Hindustan Composites' Ghatkopar (Maharashtra) plant discussed above (see page 25), 36 out of the 41 workers diagnosed with asbestosis filed claims under the Employee's Compensation (EC) Act in December 2005. The total amount claimed was Indian Rupees 4,453,127, while independent claims varied between Indian Rupees 33,391 to Indian Rupees 316,680 depending on the extent of impairment calculated under the rules of the EC Act.

[80]Dutta, "The Indian Government's Complicity in the Asbestos Scandal."

The 36 claimants were unsuccessful because the Court did not accept the evidence. Some of those who have lost have gone into appeal.

Dr. Venkiteswaran Murlidhar and Pralhad Malvadkar of the Occupational Health and Safety Centre (OHSC) in Mumbai, in concert with Mr. Krishnendu Mukherjee worked with the victims and their families to win compensation from Turner & Newall (T&N). The victims identified from T&N subsidiaries across India began receiving compensation from the company in October 2010. To date, the Trust has paid 1,045 claimants a total of £5,841,199.

In addition to the workers employed by Hindustan Ferodo, Dr. Venkiteswaran Murlidhar identified over 350 additional victims of primary asbestos exposure from Hindustan Ferodo. Nearly 70 cases of secondary asbestos exposure were also identified.

National enforceable occupational exposure limits for chrysotileasbestos

Threshold Limit Value-Time Weighted Average (TLV-TWA) for Asbestos fibres was 1 fibre/cc (or 1 fibre/mL) according to the Factories Act when TLV was introduced in the Act in 1987 following Bhopal tragedy. In November, 2013 TLV for Amosite, Chrysotile and Crocidolite was brought down to 0.1 fiber/cc from 2 fibers/ml.

The system for inspection and enforcement of the exposure limits

The State Labour Department is the body responsible for carrying out occupational health and safety inspections in factories registered in their respective states. In many states Factory Inspectorate (now renamed as Director Industrial Safety and Health - DISH) offices have an Industrial Hygiene Laboratory which has the responsibility to enforce exposure limits. The problem is, they do not have qualified industrial hygienists, existing staff do not have adequate training, and they do not have proper and modern equipment. Form 37 of the Factory Rules deals with the work environment. Private service providers are invited once in a while to measure the environment and based on the report, Form 37 is submitted to the DISH officer. The rule is not clear at what interval the workplace air is to be measured and the form is to be submitted.

In mining operations, the Directorate General on Mines Safety is responsible for conducting safety and health inspections in mines and oil fields.

Routine inspections are mandated to occur, however most inspections happen after a complaint is filed or when it is considered to be necessary to ensure the safety of workers. Workplaces employing less than 40 workers are only required to submit a self-certificate of inspection. Certain states, like Punjab, Gujarat and Maharashtra, have adopted a self-certification system which requires an inspection once every five years where employers have self-certified their compliance with labor laws.

Inspectors have the power to file complaints in the courts for violation of provisions of Fatory Act but such powers are not enjoyed by the workers or trade union representing them. Labor law violations are subject to fines and/or imprisonment. Typically, however, before launching prosecution against factory owners, inspectors give warnings and advice to first-time offenders. Furthermore, there are no uniform standards for factory inspections across the country.

Factory inspection has severely affected with decreasing numbers of inspectors in all sates following policy to educe Government expenditure. Again to meet the "ease of doing business standards"to attract FDI, Government policy is now to restrict inspections. The trend towards adopting self-certification and the declining share of inspected factories means that the enforcement of asbestos levels in workplaces across India is highly inadequate.

India has ratified the ILO's convention on labor inspection (C. 81, 1947), which requires frequent inspections and sets a benchmark ratio (for developing countries) of 1 inspector to 40,000 workers. India is far from reaching this level. In fact, in 2011, highly industrialized states such as Gujarat, Maharashtra and Tamil Nadu, had less than 60% of inspector posts filled. Since the late 1980s, the proportion of registered factories that have been inspected has declined (from 63% to 18% between 1986 and 2008).[81]

Figure 13: Asbestos Textile Cuttings in a mezzanine floor constructedin a shop which manufactures andsells asbestos gloves and other safety equipment, right in the heart of the Gujarati city of Vadodara

[81]Sundar, "The Myth of Inspector-Raj in India."

Photo Credit: Hein du Plessis

Estimated economic losses due to asbestos-related diseases.

Major studies on epidemiology of asbestos-related diseases in the country

Table 6 on page 38 summarizes some of the main findings on studies on the epidemiology of asbestos-related diseases in India conducted over the last decade.

Table 6: Main Findings of Major Epidemiological Studies of Asbestos Related Diseases in India

Year Published	Study Site	Location	Sample Size	Main Findings
2016	Clutch manufacturing	India	14	11 out of 14 (71%) diagnosed to have asbestos-induced lung disease[82]
2008	Grinding, milling, manufacturing small-scale units; manufacture of asbestos-based products	Rajasthan & Maharashtra	308	Asbestosis in unorganized sector workers 21%; in Organized sector plants 26% of workers tested diagnosed with asbestosis[83]
2007	Asbestos cement sheet manufacturing	India	140	Even when asbestos exposure remains within the specified threshold limit value, the risk of asbestos related diseases is not eliminated[84]
2005	Asbestos composite mill	Maharashtra	181	41 out of 181 (23%) diagnosed with asbestosis[85]
2005	Asbestos Mining	Andhra Pradesh	N/A	Prediction that India will experience an increase in asbestos-related diseases in the future. The pattern in India is expected to conform to other countries in terms of the latency period, but it will also diverge based on certain characteristics specific to the Indian asbestos industry (such as frequent employment of women and exposure beginning at an earlier age)[86]
1996	Asbestos Mining	Andhra Pradesh and Rajasthan		Women workers—mostly employed in milling and processing units near mines—are expected to inhale asbestos fibres more than men (who work underground or in open cast mines). The prevalence of lung function impairment was more common among millers and in workers who were indirectly exposed to asbestos fibres.[87]
1985	Asbestos product industry	India	N/A	Some small scale units in which dust exposure was heavy employed children and adolescents; Acknowledgement of the dearth of epidemiological studies on ARDs and the insufficient expertise and manpower required to evaluate workplaces and accurately diagnose ARDs in a timely manner in India.[88]

[82]Gothi et al., "Asbestos-Induced Lung Disease in Small-Scale Clutch Manufacturing Workers."

[83]Rahman, "Health Hazards due to Asbestos Exposure in India."

[84]Ansari et al., "Environmental Health Survey in Asbestos Cement Sheets Manufacturing."

[85]Muralidhar and Kanhere, "Asbestosis in an Asbestos Composite Mill at Mumbai: A Prevalence Study."

[86]Dave and Beckett, "Occupational Asbestos Exposure and Predictable Asbestos-Related Diseases in India."

Appendix

A1. Gujarat Factory Rules (1963)[89]

Regulations on Asbestos

Schedule XVII Handling and Processing Of Asbestos.

Manufacture Of Any Article of Asbestos and Any Other Process of Manufacture or Otherwise In Which Asbestos Is Used In Any Form[90]

1. Application:

This Schedule shall apply to all factories or parts of factories in which any of the following processes is carried on:

a) breaking, crushing, disintegrating, opening, grinding, mixing or sieving of asbestos and any other processes involving handling and manipulation of asbestos incidental thereto;
b) all processes in the manufacture of asbestos textiles including preparatory and finishing processes;
c) making of insulation slabs or sections, composed wholly or partly of asbestos, and processes incidental thereto:
d) making or repairing of insulating mattresses, composed wholly or partly of asbestos, and processes incidental thereto:
e) manufacture of asbestos cardboard and paper;
f) manufacture of asbestos cement goods:
g) application of asbestos by spray method:
h) sewing, grinding, turning, abrading and polishing in dry state of articles composed wholly or partly of asbestos;
i) cleaning of any room, vessel, chamber, fixture or appliance for the collection of asbestos dust; and
j) any other processes in which asbestos dust is given off into the work environment.

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[87]Dave et al., "The Correlation of Chest and Pulmonary Functions Tests in Asbestos Miners and Millers."

[88]GOI, "Report of the Committee to Study Health Hazards in the Asbestos Industry"; see also Patel, "The Struggle Against Asbestos-Related Diseases in Gujarat."

[89]Refer to https://dish.gujarat.gov.in/Images/dish/pdf/01The_Gujarat_Factories_Rules_1963.pdf for full text of the Gujarat Factories Rules, 1963

[90]Subs. by Notfn. dated 15.2.1995 [15.2.1995].

2. Definitions:

For the purpose of this Schedule:-

a) "asbestos" means any fibrous silicate mineral and any admixture containing action lite, amosite, anthophylite,chrysotile, or any mixture thereof, crude, crushed or opened;

1) the term "asbestos dust" means airborne particles of asbestos or settled particles of asbestos which are liable to become airborne in the working environment;
2) the term "airborne asbestos dust" means, for purposes of measurement, dust particles measured by gravimetric assessment of other equivalent method;
3) the term "respirable asbestos fibers" means asbestos fibers having a diameter of less than 3 cm, and a length-to- diameter ratio greater than 3:1. Only fibers of a length greater than 5 cm shall be taken into account for the purpose of measurement;
4) The term "exposure to asbestos" means exposure at work to airborne respirable asbestos fibers or asbestos dust, whether originating from asbestos or from minerals, materials or products containing asbestos;

b) "Asbestos textile" means yarn or cloth composed of asbestos or asbestos mixed with any other material;

c) "Approved" means approved for the time being in writing by the Chief Inspector;

d) "Breathing apparatus" means a helmet or face piece with necessary connections by means of which a person using it breathes air free from dust, or any other approved apparatus;

e) "Efficient exhaust drought' means localized ventilation by mechanical means for the removal of dust so as to prevent dust from escaping into air of any place in which work is carried on. No drought shall be deemed to be efficient which fails to control dust produced at the point where such dust originates;

f) "Preparing" means crushing, disintegrating, and any other processes in or incidental to the opening of asbestos;

g) "Protective clothing" means overall and head covering which (in either case) shall when worn exclude asbestos dust.

3. Tools and equipment:

1) Any tools or equipment used in processes to which this Schedule applies shall be such they do not create asbestos dust above the permissible limit or are equipped with efficient exhaust draught.

2) Prohibition:
    a) Every process or equipment related to the milling of asbestos are or processing of asbestos fiber, release dust beyond the permissible limit, such process or use of such equipment shall be prohibited.
    b) The use of crocidolite and products containing this fibre shall be prohibited.
    c) Spaying of all forms of asbestos shall be prohibited.
    d) The installation of friable asbestos insulation materials shall be prohibited.
3) Substitution:- Asbestos shall be used only when its risks can be prevented or controlled, otherwise, it shall be replaced, when technically feasible, by other materials or the use of alternative technologies, scientifically evaluated as harmless or less harmful.
4) Exposure to the workers.:- the number of persons assigned to work involving exposure to asbestos and the duration of their exposure shall be kept to the minimum required for the safe performance of the task.
5) Demarcation of area.:- the areas of activity which involve exposure to asbestos shall be clearly demarcated and indicated by warning signs restricting unauthorized access.

4. Exhaust drought:-

1) An efficient exhaust drought shall be provided and maintained to control dust from the following processes and machines;
    a) manufacture and conveying machinery, namely :-
        i. preparing, grinding or dry mixing machines:
        ii. guarding, card waste and ring spinning machines, and looms;
        iii. machines or other plant with asbestos; and
        iv. machines used for the sewing, grinding, turning, drilling, abrading or polishing; in the dry state, or articles composed wholly or partly of asbestos;
        v. cleaning and grinding of the cylinders or other parts of a carding machines:
        vi. chambers, hoppers or other structures into which loose asbestos is delivered or passes;
        vii. work-benches for asbestos waste sorting or for other manipulation of asbestos by hand;
        viii. work places at which the filming or employing of sacks, skips or other portable containers, weighing or other process incidental which is effected by hand, is carried on;

ix. sack cleaning machines;
x. mixing and blending of asbestos by hand: and
xi. any other process in which dust is given off into the work environment.

2) Exhaust ventilation equipment provided in accordance with sub-paragraph (1) shall, while any work of maintenance or repair to the machinery, apparatus or other plant or equipment in connection with which it is provided is being carried on, be kept in use so as to produce an exhaust draught which prevents entry of asbestos dust into the air of any work place.
3) Arrangements shall be made to prevent asbestos dust discharged from exhaust apparatus being
4) drawn into the air of any workroom.
5) The asbestos bearing dust removed from any workroom by the exhaust system shall be collected in suitable receptacles or fitter bags which shall be isolated from all work areas.

5. Testing and examination of ventilating system:-

1) All ventilating system used for the purpose of extracting or suppressing dust as required by this schedule shall be examined and inspected once every week by a responsible person. It shall be thoroughly examined and tested by a competent person once in every period of 12 months. Any defects found by such examinations or test shall be rectified forthwith.
2) A register Form No. 20-A containing particulars of such examination and tests and the state of the plant and the repairs or alternations (if any) found to be necessary shall be kept and shall be available for inspection by an Inspector.

6. Segregation in case of certain process:-

Work places where the use of asbestos may result in the release of asbestos dust into the air shall be separated from the general working environment in order to avoid possible exposure of other workers to asbestos.

7. Storage and distribution of loose asbestos:-

All loose asbestos shall, while not in use, be kept in suitable closed receptacles which prevent the escape of asbestos dust there from. Such asbestos shall not be distributed within a factory except in such receptacles or in a totally enclosed system of conveyance.

8. Asbestos sacks:-

1) All sacks used as receptacles for the purpose of transport of asbestos within the factory shall be constructed of impermeable materials and shall be kept in good repair.
2) A sack which has contained asbestos shall not be cleaned by hand- beating but by a machine, complying with paragraph 3(1).

3) Occupier shall dispose of waste containing asbestos in a manner that dose not pose a health risk to the workers concerned, including those handling asbestos waste, or to the population in the vicinity of the enterprise.

9. Maintenance of floors and workplaces:-

1) In every room in which any of the requirements of this Schedule apply
    a. the floor, work-benches, machinery and plant shall be kept in a clean state and free from asbestos debris and suitable arrangements shall be made for the storage of asbestos not immediately required for use: and
    b. the floors shall be kept free from any materials, plant or other article not immediately required for the work carried on in the room, which would obstruct the proper cleaning of the floor.
2) The cleaning as mentioned in sub-rule (1) shall, so far as is practicable, be carried out by means of vacuum cleaning equipment so designed and constructed and so used that asbestos dust neither escapes nor is discharged into the air of any work-place.
3) When the cleaning is done by any method other than that mentioned in sub-paragraph (2), the person doing cleaning work and any other person employed in that room shall be provided with respiratory protective equipment and protective clothing.
4) The cleaning equipment used in accordance with provisions of sub-paragraph (2), shall be properly maintained and after each cleaning operation, its surfaces kept in a clean state and free from asbestos waste and dust.
5) Asbestos waste shall not be permitted to remain on the floors or other surface at the work place at the end of the working shift and shall be transferred without delay to suitable receptacles. Any spillage of asbestos waste occurring during the course of the work at any time shall be removed and transferred to the receptacles maintained for the purpose without delay.

10. Breathing apparatus and protective clothing:-

1) An approved breathing apparatus and protective clothing shall be provided and maintained in good conditions for use of every person employed.:-
    a. In chambers containing loose asbestos;
    b. In cleaning, dust settling or filtering chambers or apparatus:
    c. In cleaning the cylinders, including the doffer cylinders, or other parts of a carding machine by means of hand stickles, and in filling, beating or leveling in the manufacture or repair of insulating mattresses, and
    d. In any other operation of circumstances in which it is impracticable to adopt technical means to control asbestos dust in the work environment within the permissible limit.

2) Suitable accommodation in conveniently accessible position shall be provided for the use of persons when putting on or taking off breathing apparatus and protective clothing provided in accordance with this rule and for the storage of such apparatus and clothing when not in use.
3) All breathing apparatus and protective clothing when not in use shall be stored in the accommodation provided in accordance with sub-rule (2) above.
4) All protective clothing in use shall be de-dusted under an efficient exhaust draught or by vacuum cleaning and shall be washed at suitable intervals. The cleaning schedule and procedure shall be such as to ensure the efficiency in protecting the water.
5) All breathing apparatus shall be cleaned and disinfected at suitable intervals and thoroughly inspected once every month by a responsible person.
6) A record of the cleaning and maintenance and of the condition of the breathing apparatus shall be maintained in a register provided for that purpose which shall be readily available for inspection by an Inspector.
7) No person shall be employed to perform any work specified in sub-paragraph (1) for which breathing apparatus is necessary to be provided under that sub-paragraph unless he has been fully instructed in the proper use of that equipment.
8) No breathing apparatus provided in pursuance of sub-paragraph (1) which has been worn by a person shall be worn by another person unless it has been thoroughly cleaned and disinfected since last being worn and the person has been fully instructed in the proper use of that equipotent.

11. Separate accommodation for personal clothing:-

A separate accommodation shall be provided in conveniently accessible position for all persons employed in operations to which this Schedule applies for storing of personal clothing. This should be separated from the accommodation provided under sub-paragraph (2) to prevent contamination of personal clothing.

12. Washing and bathing facilities:-

1) There shall be provided and maintained in a clean state and in good repair, for the use of all workers employed in the processes covered by the schedule, adequate washing and bathing places having a constant supply of water under cover at the rate of one such place for every 15 persons employed.
2) The washing places shall have standpipes placed at intervals of not less than one meter.

3) Not less than one half of the total number of washing places shall be provided with bathrooms. Sufficient supply of clean towels made of suitable material shall be provided: Provided that such towels shall be supplied individually for each worker if so ordered by the Inspector .
4) Sufficient supply of soap and nail brushes shall be provided.
5) At least thirty minutes time shall be allowed, within working hours, for Changing, showering or washing after the work shift.

13. Mess room:-

1) There shall be provided and maintained for the use of all workers employed In the factory covered by this schedule, remaining on the premises during the rest intervals, a suitable mess room which shall be furnished with:-
    a. sufficient tables and benches with back rest, and
    b. adequate means for warming food.
2) The mess room shall be placed under the charge of a responsible person and shall be kept clean.

14. Prohibition of employment of young persons:-

No young person shall be employed in any of the process covered by this Schedule.

15. Prohibition relating to smoking:-

No person shall smoke in any area where processes covered by this schedule are carried on. A notice in the language understood by majority of the workers shall be posted in the plant prohibiting smoking at such areas.

16. Cautionary notice:-

A. Cautionary notice shall be displayed at the approaches and along the parameter of every asbestos processing area to warn all persons regarding.:-

a) hazards to health from asbestos dust:
b) need to use appropriate equipment:
c) prohibition of entry to unauthorized persons, or authorized persons but without protective equipment.

B. Information from occupier

The following information shall be sent by the occupier of the factory.:-

a) the type and quantity of asbestos used;
b) the activities and processes carried out'
c) the products manufactured;
d) the number of workers exposed and the level and frequency of their exposure;
e) the preventive and protective measures taken;
f) any other information necessary to safeguard the worker’s health.

C. Such notices shall be in the language understood by the majority of the workers.

D. Labeling

a) The labeling shall be printed in the language or languages in common use in the State indicating that the container or product contains asbestos, the inhalation of asbestos dust carries a health risk and appropriate protective measures shall be taken.
b) The occupier of the factory shall provide a data-sheet listing the asbestos, content, health hazards and appropriate protective measures for the material or product to consumers.

E. Occupier shall provide workers with adequate information in an appropriate from on the health hazards to their families or others which could result from taking home clothing contaminated by asbestos dust.

[F.[91]A worker who has removed himself from a work situated for which he has a reasonable justification to believe, presents serious danger to his life or health shall

1) alert his immediate supervisor;
2) be protected from retaliatory or disciplinary measures.
    i. No measure prejudicial to a worker shall be taken by reference to the fact that, in good faith, he complained of what he considered to be breach of statutory requirements or a serious inadequacy in the measures taken by the employer in respect of occupational safety and health and the working environment].

17. Air monitoring:-

1) To ensure the effectiveness of the control measures, monitoring of asbestos fiber in air shall be carried out once at least in every shift and measured or calculated in terms of time-weighted average concentration and the record of the result so obtained shall be entered in a register specially maintained for the purpose by qualified person. Membrane Filter Technique (MFT) shall be used for the measurement of the air borne asbestos fiber dust.
2) The records of the monitoring of the working environment shall be kept for a period of not less than 30 years.

18. Medical facilities and records of medical examinations and tests:-

1) The occupier of every factory or part of the factory to which the Schedule applies, shall:-
    (a) employ a qualified medical practitioner for medical surveillance of the workers covered by this schedule whose employment shall be subject to the approval of the Chief Inspector to Factories:

[91]Added by Noti. No. KHR-2007-58-FAC-2006-2573-M(3) dt 21-6-07 G.G.G Exty.Pt IV-A No. 101 dt 27-6-2007 P. 101-1

(b) provide to the said medical practitioner all the necessary facilities for the purpose referred to in clause (a).

2) The record of medical examinations and appropriate tests carried out by the said medical practitioner shall be maintained in a separate register approved by the Chief Inspector of Factories, which shall be kept readily available for inspection by the Inspector.

19. Medical examination by Certifying Surgeon:-

(1) Every worker employed in the processes specified in paragraph 1 shall be examined by a Certifying Surgeon within 15 days of his first employment. Such examination shall include pulmonary function tests, tests for detecting asbestos fibers in sputum and chest X-ray. No worker shall be allowed to work after 15 days of his first employment in the factory unless certified fit for such employment by the Certifying Surgeon.

(2) Every worker employed in the processes referred to in sub-paragraph (1) shall be re-examined by a Certifying Surgeon at least once in every twelve calendar months. Such examinations shall, wherever, the Certifying Surgeon considers appropriate, include all the tests specified in sub- paragraph (1) except chest X-ray which shall be carried out once in 3 years.

(3) The Certifying Surgeon after examining a worker, shall issue a Certificate of Fitness in Form 27-A. The record of examination and re- examination carried out shall be entered in the certificate and the certificate shall be kept in the custody of the manager of the factory. The record of each examination carried out under sub-paragraphs (1) and (2), including the nature and the results of the tests, shall also be entered by the Certifying Surgeon in a health register in Form 20.

(4) The Certificate of Fitness and the health register shall be kept readily available for inspection by the Inspector.

(5) If at any time the Certifying Surgeon is of the opinion that a worker is no longer fit for employment in the said process on the ground that continuance therein would involve special danger to the health of the worker, he shall make a record of his findings in the said certificate and the health register. The entry of his findings in those documents should also include the period for which he considers that the said person is unfit to work in the said process.

(6) No person who has been found unfit to work as said in sub- paragraph (5), shall be re- employed or permitted to work in the said processes unless the Certifying Surgeon, after further examination, again certifies him fit for employment in those processes.

20.

(1) Appropriate medical examination shall continue to be available to workers after termination of an assignment involving exposure to asbestos.

(2) The medical examinations, tests and investigations provided in this Schedule shall be carried out as far as possible in working hours and shall entail no cost to the worker.

(3) The results of medical examination shall be used to determine health status with regard to exposure to asbestos and shall not be used to discriminate against the worker.

(4) Workers shall be informed in an adequate and appropriate manner, of the results of the medical examinations and receive individual advice concerning their health in relation to their work.

(5) When continued assignment to work involving exposure to asbestos is found to be medically inadvisable, every effort shall be made to provide the workers concerned with other means of maintaining their income.

[(6)[92] Records of the monitoring of exposure of workers as well as the sections of their medical files relevant to health hazards due to exposure to asbestos and chest radiographs shall be maintained and keep maintaining the health record of every worker up to a minimum period of 40 years from the beginning of the employment or 15 years after retirement or cessation of the employment whichever is later.

(7) In case of closure of the factory or after termination of the assignment of a worker, records and information kept in accordance with paragraph 20(6) above shall be deposited in the office of the Chief Inspector of Factories, Gujarat State.]

[92]Subs, by Noti. No. KHR-2007-17-FAC-2006-G0I-172-M(3) dt 28-2-07 G.G.G Exty.Pt IV-A No. 28 dt 23-3-2007 P. 28-1

A2. Recommendations for Safety and Health Requirements Relating to Occupational Exposure to Asbestos

Environmental Levels

The concentration of airborne asbestos particulates in the working environment shall be controlled so that workers are not exposed to levels in excess of the following unless specified otherwise by the competent authority:

a) For 8 hours time-weighted average (TWA), the permissible exposure limit shall be 2 fibres per cm cubed; and
b) For peak level sample, the permissible exposure limit shall be 10 fibres per cm cubed,

Medical Surveillance

All the workers potentially exposed to asbestos dust above the action level shall be provided with medical surveillance by the employer,

Medical surveillance shall be provided free of cost to the workers.

Medical surveillance shall be carried out by occupational physician or chest physician or a physician trained in occupational medicine.

The recommendations laid down in this standard serve only as basic medical guidelines. Occupational physicians may wish to supplement these standards to assist in proper evaluation of individual cases.

Medical surveillance program shall consist of the following:

a) Pre-employment medical examination;
b) Periodic medical examination;
c) Medical examination at cessation of employment
d) Maintenance of medical records; and
e) Health education.

Personal Protection

Respiratory equipment, protective clothing and proper hygienic facilities shall be provided to the workers likely to be exposed to asbestos dust exceeding exposure limit as given in the 'Indian Standard Recommendations for personal protection of workers engaged in handling asbestos' (*under preparation*).

Engineering Methods and Work Practices

Suitable engineering controls shall be put into practice, such as (but not limited to) isolation, enclosure, exhaust ventilation, dust collection, etc., in order to maintain the working environment within the prescribed exposure limit.

Appropriate work practices shall be followed where materials or processes are used which may give rise to asbestos dust in the working environment. Such work practices shall include the following:

Monitoring in the workplace

Static and personal monitoring shall be carried out in order to identify the sources of asbestos dust emission and to determine the extent of asbestos dust exposure when asbestos or products containing asbestos are produced, handled or used in such a manner as to be liable to emit airborne dust.

Labeling of Risk Areas

All workplaces where asbestos dust may cause a hazard shall be clearly indicated as an asbestos dust exposure area through the use of a well-displayed sign which identifies the hazard and the associated health effects.

A3. Section 52A in the Employees State Insurance Act (1948)

52A. Occupational disease.

1. If an employee employed in any employment specified in Part A of the Third Schedule contracts any disease specified therein as an occupational disease peculiar to that employment or if an employee employed in the employment specified in Part B of that Schedule for a continuous period of not less than six months contracts any disease specified therein as an occupational disease peculiar to that employment or if an employee employed in any employment specified in Part C of that Schedule for such continuous period as the Corporation may specify in respect of each such employment, contracts any disease specified therein as an occupational disease peculiar to that employment, the contracting of the disease shall, unless the contrary is proved, be deemed to be an "employment injury" arising out of and in the course of employment
2.
   i. Where the Central Government or a State Government, as the case may be, adds any description of employment to the employments specified in Schedule III to the Employee's Compensation Act(1923) (8 of 1923), by virtue of the powers vested in it under sub-section (3) of section 3 of the said Act, the said description of employment and the occupational diseases specified under that sub-section as peculiar to that description of employment shall be deemed to form part of the Third Schedule.
   ii. Without prejudice to the provisions of clause (i), the Corporation after giving, by notification in the Official Gazette, not less than three months ' notice of its intention so to do, may, by a like notification, add any description of employment to the employments specified in the Third Schedule and shall specify in the case of employments so added the diseases which shall be deemed for the purposes of this section to be occupational diseases peculiar to those employments respectively and thereupon the provisions of this Act shall apply, as if such diseases had been declared by this Act to be occupational diseases peculiar to those employments
3. Save as provided by sub-sections (1) and (2), no benefit shall be payable to an employee in respect of any disease unless the disease is directly attributable to a specific injury by accident arising out of and in the course of his employment
4. The provisions of section 51A shall not apply to the cases to which this section applies.

A4. Asbestos Companies and Traders in India

Name &LocationOf Industry	Total
Andhra Pradesh	**7**
Hyderabad Industries Ltd	3
Iworld Enterprises	1
Shakti Roofings Ltd./ Visaka Industries Ltd	1
Visaka Industries Ltd.	2
Assam	**3**
Assam Roofing Ltd	1
Jumbo Roofing and Tiles	1
North East Roofing Pvt Ltd	1
Bihar	**2**
Nibhi Industries	1
Ramco Industries Ltd.	1
Delhi	**6**
A Infrastructure Ltd.	1
Everest Industries Ltd.	1
Pearl Frictions Inc	1
Signet International	1
Thermal Papers Pvt Ltd	1
Vijay Industrial Packings (Vijay Dhingra)	1
Gujarat	**97**
A V Plastic	1
Aalap Associates	1
AGNI FIBRE BOARDS PVT. LTD.	1
Amit Engineering Corporation	1
Arvind Saw Mill	1
Asbestos (India)	1
Asbestos Engg Co	1
Ashinishi Mktg & Engg Co	1
Astha International	1
Bhakti Associates	1
Champion Jointings Pvt Ltd	1
Chamunda Industrial Packing	1
Crompton Asbestos Packing Co	1
Daga Marketing Private Limited	1
Damani Roofing Solution	1
Deeva Traders	1
Desai Hardware & Gen.Store	1
Disauri Engrs	1
Eagle Asbestos Private Limited	2
Everest Industries Limited	1
Fibreglass Industries	1
Gala Polymers	1
Gayatri Enterprises	1
Giriraj Alloys & Steel	1
Gujarat Composite Limited	1
Hari Om Enterprises	1

Hemandrakumar & Brothers	1
India Sales Timer and Plywood	1
Jagjiwan Enchem Udyog Ltd	1
Jay Corporation	1
Jay Kabir Trading Co.	1
Jay Trading Co	1
Jayshri Trading Co	1
Kachchh Cement Project / Gujarat Anjan Cement Ltd.	1
Kavit Enterprise	1
Laxmi Sales Corporation	1
Lucky Enterprise	1
Lucky Trading Co	1
M D Shah and Co	1
M S Trading Co	1
Mahavir Enterprise	1
Maheshwari Trading Co	1
Mark Profile	1
Mgk Enterprise	1
Mohan Agencies	1
Mohan Sales Corporation	1
MTS Engineers	1
N. B. ENTERPRISE	1
Noble Traders	1
Pramount Asbestos	1
PERFECT PACKING INDUSTRIES	1
Raj Agencies	1
Raj Asbestos Co	1
Raj Trading	1
Ram And Co	1
Ramco	1
Ramco Industries Limited	1
Recepient Pack (India) Pvt Ltd	1
Red Rose Corporation	1
Reliance Cement Works And Trading Co	1
Royal Asbestos	1
S K Traders	1
Sakariya Trading Co	1
Sanjay Trade & Industries	1
Shah Woodply	1
Sheetal Corporation	1
Shiv Shakti Enterprises	1
Shivam Enterprise	1
Shree Firepack Insulator Pvt Ltd	1
Shree Khodiar Asbestos Co.	1
Shree Krishna Corporation	1
Shree Lotus Corporation	1
Shree Sanjay Trading Co	1

Shree Shivsagar Traders	1
Shreeji Traders	1
Soham Marketing	1
Suhrad Agency	1
SUPER GRAFLON PVT LTD	1
Super Waudite Jointings Pvt.Ltd.	1
Supreme Asbestos Trading Co	2
Suraj Agency	1
Swastik Roofing Limited	1
Thakkar Natvarlal Zinabhai & Co	1
Thakkar Ramji Virji & Sons	1
The Ashapuri Timber Company	1
V G Sales Corporation	1
Varun Enterprise	1
Venkatesh Mktg. and Sales Service	1
Vikas Corporation	1
Visaka Industries Ltd - Secunderabad	1
Vraj Enterprise	1
Western Sales Service	1
Yash Marketing	1
Yogendrakumar & Brothers	1
Zenith Mktg	1
Haryana	**3**
Charminar Jointing Spvt Ltd	1
Hyderabad Industries Ltd	2
Himachal Pradesh	**1**
Sturdy Industries Ltd.	1
Jharkhand	**1**
Hyderabad Industries Ltd	1
Karnataka	**1**
Visaka Industries Ltd.	1
Kerala	**1**
Hyderabad Industries Ltd	1
Madhya Pradesh	**2**
Jaypee Cement Products	1
Kanta Enterprises	1
Maharashtra	**35**
Arihant Industrial Agency	1
Ashdeep Friction Ltd	1
Bosch Chassis Systems Pvt Ltd (Formerly Kalyani Brakes Ltd)	1
Capital Commerce (Formerly M/S Rufit Industries Ltd)	1
Champion Jointings Pvt Ltd	1
Champion Seals Pvt Ltd	1
Eastwell Asbestos Industries Pvt Ltd	1
Everest Industries Ltd	1
Evertex Industries Pvt. Ltd	1
Fimm Industries	1

Hetali Enterprise	1
Hindustan Composite Ltd	3
Hindustan Composite, Bhandara	1
Hyderabad Industries Ltd	1
J K Overseas	1
Jain Asbestos	1
Kross International	1
Lion Asbestos Packing Industries	1
Mechanical Packing Industries Lvt Ltd	1
Neela Asbestos	1
New Shyadri Industries Ltd	1
Rex Sealing & Packing Industries Pvt Ltd	1
Roofit Industries Ltd	1
Sahyadri Industries Ltd.,	1
Sealant & Gasket India Pvt Ltd	1
Shakti Roofing Pvt Ltd	1
Standard Friction Components Ltd	1
Super Gasket Industries	1
Swastik Roofing Ltd	1
UniKlinger India Pvt Ltd	1
Visaka Industries Ltd.	1
Wada Arun Asbestos Pvt Ltd	1
Wilson Roofing Product Pvt Ltd	1
Orissa	**4**
Hyderabad Industries Ltd	1
Pgl Group (Kamal Agarwal)	1
Ual-Orissa	1
Visaka Industries Ltd.	1
Punjab	**1**
Deepak International Limited (AJAY K. JAIN)	1
Rajasthan	**4**
Ankit Roofings Ltd	1
MRK Pipes Ltd	1
Rajasthan Asbestos Cement Co Ltd	1
Visaka Industries Ltd.	1
Tamil Nadu	**9**
A R Marketing Agencies	1
Hyderabad Industries Ltd	1
Madras Asbestos Stores	1
Ramco Industries Ltd.	1
Rane Brake Lining Ltd	1
Supreme Industrial Co.	1
Tamilnadu Cements Corpn.Ltd	1
Uhs	1
Vigneswaraa Industries	1
Telangana	**3**
Rane Brake Lining Ltd	1
Visaka Industries Ltd.	2

Uttar Pradesh	**9**
Ferolite Jointings Ltd	1
Hilite Industries (P) Ltd	1
Hyderabad Industries Ltd	1
Jaypee Chunnar cement	1
Superlite Jointings Pvt Ltd	1
U P Asbestos Ltd, Dadri	1
U P Asbestos Ltd., Lucknow	1
UAL Industries Ltd.	1
Visaka Industries Ltd.	1
West Bengal	**8**
Assam Roofing Ltd.	1
Balmukund Cement & RoofingLtd.	1
Bengani Marketing Pvt. Ltd.	1
Calcutta Asbestos Products	1
Mridulaa Asbestos Products	1
UAL Industries Ltd.	2
Visaka Industries Ltd.	1
Grand Total	**197**

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